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Beyond the Summit: Next Steps in Arms Control



United States Department of State
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Following is an address by Paul H. Nitze, Special Adviser to the President and the Secretary of State on Arms Control Matters, before the National Press Club, Washington, D.C., December 15, 1987.

Before getting into the future, let me say a few words about the past.

When I was appointed to head the U.S. delegation to the INF [intermediate-range nuclear forces] negotiations at their outset in 1981, I made two immediate decisions.

First, we would prepare a draft of the "zero option" treaty we wanted before the negotiations began.

Second, we would keep an issues book in which we would enter, day-by-day, what had been said by either side on each issue that arose in the talks.

At the end of the first year, there were 35 issues in our book. Of those 35, five issues were clearly the most important, so we focused on those five. Over the succeeding years, especially at Reykjavik, we finally removed the five issues. But having removed those boulders blocking an agreement, we still faced a lot of rocks.

This past October, after the 2-day meeting in Washington between Secretary Shultz and Foreign Minister Shevardnadze in which the INF issues that loomed largest were resolved, it was left that Soviet Ambassador Viktor Karpov and I were to try to resolve the remaining issues the next day. I asked Karpov how many issues he had on his

list, and he said there were 35, of which five were the most important.

I concluded that it is inherent in the human mind, when confronted with a very complex situation, to simplify it to 35 considerations, and then to 5.

Next Steps

During last week's meetings, President Reagan and General Secretary Gorbachev accomplished a lot. They signed the INF Treaty we had been seeking for 6 years. They issued a joint statement which significantly advanced us toward a stabilizing START [strategic arms reduction talks] treaty. And they agreed on language on defense and space which narrows the issues and promises to make them more manageable.

Where do we go from here? There are many tasks that come to mind; by rough estimate, about 35. But allow me to concentrate on the most important five. These are:

- Ratifying the INF Treaty;
- Continuing our work on a START treaty;
- Dealing with defense and space issues;
- Continuing our efforts on non-nuclear arms control; and
- Maintaining our focus on the broader context of U.S.-Soviet relations.

Ratifying the INF Treaty

Clearly, our most immediate and important task is to get the advice and consent of the Senate in favor of

ratification of the INF Treaty. All of our other efforts depend on this outcome.

Why should the Senate so advise the President? Because this treaty enhances the security of the United States and its allies, and it contains the verification measures necessary to monitor Soviet compliance with confidence and to detect any militarily significant noncompliance in time for us to respond appropriately.

To determine how the treaty enhances our security interests, one must recall how the INF issue and the ensuing negotiations arose in the first place.

In the late 1970s, the Soviet Union began deployment of SS-20 intermediate-range missiles, greatly enhancing the nuclear threat to both our European and Asian friends and allies. This raised concern, particularly among Europeans, of a significant imbalance in the spectrum of nuclear capabilities directly affecting not only NATO Europe but also other countries on the periphery of the U.S.S.R.

In its 1979 dual-track decision, the alliance determined to redress this imbalance. It decided:

First, to deploy comparable missiles of its own; and

Second, to seek to minimize, through negotiations, the number of such missiles either side would deploy.

In 1981, President Reagan proposed NATO's preferred outcome: the complete elimination of all U.S. and Soviet

missiles of this class, or the "zero option." In meeting after meeting since, the NATO allies, and our Asian allies as well, reiterated their preference for this global zero outcome.

This, of course, is what we have now achieved. With the elimination of the SS-20s and all other Soviet missiles of this class, the Soviet Union will no longer possess INF missiles capable of threatening targets in Europe from Soviet soil. This perceived weakness in the structure of deterrence has been removed.

In sum, a security threat was identified, a strategy to address the threat was conceived and implemented, and an outcome was achieved that removed that threat. This is a NATO success story, enhanced by the fact that the reductions are decidedly asymmetric in NATO's favor, leading to an equal end point. This sets a good precedent for future arms reduction efforts.

It appears that much of the ratification debate will center on verification. In conducting this debate, it is important to understand the purpose of verification. We negotiate arms control treaties to limit the military capabilities of our adversary. The purpose of verification is to ensure that the treaties serve their intended purpose. That is, we want to be sure that the other side has not moved beyond the intended limits in any militarily significant way, and, if they do, we want to be able to detect such violations in time to respond as necessary.

Of course, our ability to detect and respond to violations serves to deter the other side from committing them in the first place. The type of verification regime I have described is what the President has in mind when he calls for effective verification. And we have it in the INF Treaty.

You have undoubtedly heard much about the INF verification regime. Simply put, we are entitled to onsite inspection to count Soviet INF missile systems and structures, to watch them being destroyed, to determine that no more are left after the elimination process is completed, and to check the former INF sites on short notice to make sure no missiles secretly return. We also will monitor the output of the production facility where SS-20 missiles were assembled in the past and could most readily be assembled in the future.

Does this mean that we are guaranteed that the Soviets cannot hide an INF missile somewhere on their territory? No. Only anytime, anywhere inspections without a possibility of

refusal would provide hope of such a guarantee, and we believe that ceding the same right in the INF Treaty to Soviet inspectors on our territory is not in our own interests.

But if the Soviets were to succeed in secretly retaining some missiles, they could not test them, train troops in their operation, or maintain the basing infrastructure necessary to support them, all of which we could detect. Without these, the Soviets could not maintain a militarily significant capability. Thus the regime meets the standard of effective verification.

There is one final point I wish to make on the subject of INF ratification. From both sides of the Senate, we hear talk these days about the possibility of attaching reservations to the treaty, and one reservation often suggested is to delay final implementation of the elimination of INF missiles until the conventional imbalance is resolved. Alternatively, some suggest holding up a START agreement for this purpose.

I believe that either course of action would be most unwise. We have signed the INF Treaty because it is in our security interest, as I have explained. Similarly, the START agreement we are seeking would be in our security interest. If we succeed in reaching such agreements, we should not be barred from putting them into effect.

The conventional imbalance is a serious matter, but it is not a problem caused or exacerbated by an INF agreement. Indeed, one of the forgotten facts about INF is that, prior to 1977, when there was no perceived need by NATO for INF missiles, NATO faced a conventional imbalance and a large force of Soviet INF missiles—SS-4s and SS-5s—for which NATO had no corresponding systems. After the INF agreement, we will return to the pre-1977 situation, except that even the SS-4s and SS-5s will be gone.

The way to address the conventional force problem is through unilateral NATO programs and at the negotiating table, and we are working on both. We and our allies are currently seeking to establish a mandate for conventional stability talks between NATO and the Warsaw Pact, and we are discussing with our allies improvements in conventional capabilities.

But any realistic assessment of prospects in this area would lead one to conclude that it will be at least a year or two before the problem is resolved. In the meantime, why should we allow the SS-20 threat to Europe and Asia to remain, and why should we allow the promising momentum of the START negotiations to be dissipated?

As we move forward with INF and START, however, there should be no doubt that we will maintain the capabilities necessary to deter Soviet aggression. In Europe, this will include maintaining, after the elimination of INF missiles, approximately 4,000 nuclear warheads on a variety of delivery systems, some of which can reach deep into the Soviet Union.

Trying to resolve all of our security concerns in one fell swoop is just too difficult a task. As pieces of the problem are resolved, those solutions should be implemented, as long as they do not exacerbate other problems. Both INF and the agreement we seek in START would resolve critical security problems without aggravating others; we should move forward on them now.

START

Now let me turn to the START area. In our talks last week with the Soviet arms control experts, we emphasized three groups of START issues: counting rules, sublimits, and verification. Significant headway was made on all three.

Counting rules—that is, the agreed standards by which the sides determine how the systems and components to be limited will be counted against the limits—tend to get passed off as part of the technical details of arms control, but these rules can have a profound impact on an agreement's effects.

To agree on rules by which the number of warheads carried by missiles and bombers are to be counted is not an easy matter; an agreement that appeared to be equal could be anything but if it undercounted the systems possessed mainly by one side and overcounted the systems emphasized by the other.

Last week, we made real progress on counting warheads on ballistic missiles and ALCMs [air-launched cruise missiles] on heavy bombers. For the former, each side has declared the number of warheads deployed on each type of existing missile, and the other side will verify it through agreed procedures, including onsite inspection of deployed missiles.

For the latter, the problem is somewhat different because, unlike with ballistic missiles, ALCM loads for bombers are normally less than the theoretical capacity and can also be changed readily. The Soviets agreed to our idea of attributing for counting purposes a certain number of ALCMs to each type of heavy bomber, regardless of the maximum number that bomber could carry

and the specific number it might be carrying at any given time. This approach reduces verification problems and takes into account operational realities.

The sublimit area is one on which we have been concentrating for some time. We have emphasized that 50% reductions are not inherently stabilizing; it is necessary to ensure, through sublimits, that a side cannot retain a preponderance of the most destabilizing systems.

Previously, the Soviets had agreed to a sublimit on heavy ICBMs (intercontinental ballistic missiles), the most destabilizing systems of all, at 1,540 warheads on 154 missiles, or 50% of the current Soviet level. Last week, they agreed to another sublimit, this one on ballistic missile warheads at the level of 4,900. This sublimit would force a reduction of slightly more than 50% in the warheads on the fast-flying Soviet ballistic missile force. In 1982, President Reagan proposed 5,000 for this number, so again, we have achieved a longstanding U.S. objective.

In the verification area, we were able to build on the foundation provided by INF. The Soviets agreed that START would include all of the types of inspections I mentioned earlier for INF, as well as, at least in principle, suspect-site inspections and more extensive monitoring of production facilities. This is necessary in START because we will be placing numerical limits on systems rather than banning them.

So where do we go next? Our negotiators in Geneva have created a joint bracketed treaty text, just like the one we had for INF last summer. Wherever the two sides disagree on an issue, their positions are included in brackets.

The fact that we are far enough along to have such a text is promising, and the document helps to focus negotiating efforts, but many brackets currently remain, including in the three areas I have just discussed. We still need to agree on the number of ALCMs to attribute to each type of heavy bomber and to establish procedures for verifying the number of warheads deployed on each type of existing ballistic missile. We need to address the U.S. proposal for a sublimit of 3,300 on ICBM warheads. And there is much work to be done in working out the details of verification procedures.

Beyond these questions, there are many more issues, such as the U.S. desire to ban mobile ICBMs, the number of SLCMs [submarine-launched cruise missiles] we allow outside the aggregate ceiling of 6,000 warheads

and how we verify that limit, and the question of a possible linkage between defense and space and START.

Despite all the progress we've made in START, the list of remaining issues is daunting, and the question arises of whether it is possible to complete a treaty during this Administration. My own belief is that it will be very difficult but not impossible. We will be pushing forward intensively, and we will do our best to finish the job.

Defense and Space

Since Reykjavik, the defense and space area has involved three primary issues: the length of time during which the sides would agree not to withdraw from the ABM Treaty in order to deploy defenses, what happens after the period, and what happens during the period. All three issues were discussed in detail last week; the differences remain, but progress was made on all three.

On the question of what happens after the nonwithdrawal period, the Soviets agreed that, unless the sides agree otherwise, "each side will be free to decide its course of action." This preserves the right to deploy we seek.

On the question of what happens during the nonwithdrawal period, we included language stating that the sides would observe the ABM Treaty "as signed in 1972," as well as language stating that the sides would "conduct their research, development, and testing as required, which are permitted by the ABM Treaty." This should take the sharp edges off the ABM debate, while assisting in protecting our program to proceed with SDI [Strategic Defense Initiative] research, testing, and development as a matter of national security need.

Over the next several months, as we push forward in START, we intend also to continue dealing with the three main defense and space issues.

Non-Nuclear Arms Control

Our non-nuclear arms control efforts involve primarily conventional forces and chemical weapons (CW). As I mentioned earlier, we are in the midst of mandate talks for new negotiations on conventional stability.

These negotiations would involve the 23 countries of NATO and the Warsaw Pact and would address conventional forces in Europe from the Atlantic to the Urals. Our objective in the conventional stability talks is a

verifiable agreement that would lead to a stable balance of conventional forces at lower levels. This will require far greater reductions in tanks, artillery, and other equipment on the Soviet side to eliminate the capability of the Warsaw Pact for surprise attack and sustained offensive operations and thus to restore equality and stability in conventional forces.

We hope the mandate talks will lead to actual negotiations as soon as possible, perhaps as early as next year. In the meantime, we will continue our current efforts with our NATO allies to put together a sound NATO position that we can introduce at the outset of the negotiations.

As for chemical weapons, the United States remains committed to achieving a comprehensive global ban, encompassing all nations with chemical weapons capability. We tabled a draft treaty calling for such a ban in 1984 in the 40-nation Conference on Disarmament in Geneva. Since then, we have negotiated hard to bring it about.

The key is getting a treaty that is both effective and verifiable. We are encouraged by recent Soviet agreement in principle to mandatory challenge inspection with no right of refusal and an early bilateral exchange of data.

However, there are a number of crucial issues remaining to be worked out. We have agreed with the Soviets to concentrate our bilateral talks on maintaining security during the destruction of CW stocks, protecting sensitive non-CW-related information during inspections, and the need to strengthen verification in light of new technologies, increasing proliferation, and a dual-capable chemical industry.

The Broader Context

Attaining progress in the various arms control areas is only part of the complex equation of the difficult U.S.-Soviet relationship. A long-term, sustained improvement in the relationship will depend greatly on resolving differences in other crucial areas.

For 2 years now, we have worked hard to establish with the Soviet Union a process that addresses a full range of issues—what we call the four-part agenda that encompasses arms reductions, human rights, regional conflicts, and bilateral relations. Serious differences in all of these areas have accumulated over the last four decades, and they are the source of the profound mistrust and suspicion that characterize East-West relations today.

We recently have seen greater Soviet willingness to discuss these matters in detail, and this has led to progress in some areas. For example, agreements reached over the last 2 years have greatly increased the opportunities for contact between U.S. and Soviet citizens. President Reagan and General Secretary Gorbachev have agreed that the effort to foster greater cooperation and contact on the basis of genuine mutual benefit should continue.

In two other areas—human rights and regional affairs—there remains a long way to go. We have recognized and welcomed recent Soviet human rights steps but have pointed out that human rights will remain a source of tension in East-West relations until the Soviet Union fully observes its international human rights obligations. Similarly, we have made clear that Soviet involvement in regional conflicts—whether directly, as in Afghanistan, or through

support for such regimes as Vietnam or Nicaragua—inevitably will affect Western perceptions of the Soviet Union's ultimate intentions.

The United States is ready to address all the problems candidly and constructively. In the end, however, the Soviet Union must demonstrate that it is willing to deal with its own people and its neighbors through dialogue, not intimidation. The burden both sides will bear for the foreseeable future is to manage our competition peacefully and to build a more stable and constructive relationship.

Conclusion

Thus, we have a very full agenda in the days ahead. We have no intention of resting on our laurels; to the contrary,

we want our success in INF to be the springboard for progress in other areas.

If we are to find further success, it will be because we will succeed in replicating the elements that led to the INF Treaty: strength, domestic coherence, and unity with our allies. With these assets, and with patience, we can take further steps down the road toward a safer and stabler world, with lower levels of offenses and increased reliance on effective defenses, should they prove feasible, and with a lessened risk of war. That is our ultimate goal. ■

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THURSDAY, 4 FEBRUARY 1988

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3 FEBRUARY 1988

Pg. 6

Heated Debate Over the INF Treaty Throwing the Pentagon Into Disarray

BY PETER SAMUEL
New York City Tribune Correspondent

WASHINGTON, Feb. 1 — Debate over the Intermediate Nuclear Forces (INF) treaty has split the top echelons of the Pentagon and thrown it into disarray.

Last Thursday three top Pentagon officials met to try and resolve the intelligence disputes over the INF treaty, which one contingency argues concedes the Soviets the right to maintain a substantial covert missile force.

Meeting in the secure "tank" at the Pentagon were Defense Secretary Frank Carlucci, Chairman of the Joint Chiefs Admiral William Crowe and the director of the Defense Intelligence Agency, Leonard Perroto. Carlucci and Perroto requested that Perroto reduce his estimate of the size of the Soviet SS-20 force, sources say.

The Soviets have declared they have 650 of these missiles and Secretary of State George Shultz is on record as saying he accepts the Soviet number.

Under the terms of the treaty, the Soviets must destroy their declared number of INF missiles, which will be included in a data base supplied 30 days after the treaty is fully ratified and comes into effect.

Trouble for the administration, which is desperate to get the treaty ratified, comes in the form of the "majority agreed consensus National Intelligence Estimate for 1988," which states that there are 950 SS-30s in existence. This means that the Soviets will maintain the right to save at least 300 of the

impressive 3-warhead missiles.

The 950 number is contained in the draft document of the major annual U.S. government intelligence assessment, which has the notation 11-4/88.

The "majority agreed consensus" for the NIE is the product of long discussions and compromises among a number of the top intelligence analysts in the various agencies that comprise the U.S. intelligence community. Arriving at agreed numbers on contentious issues may involve the estimates of upwards of several hundred of analysts. The majority agreed estimate is one acceptable to more than one half of the analysts in the working group on that issue.

The intelligence and research division of the Department of State and the CIA both estimated last year that there were between 550 to 600 SS-20 missiles and they were considerably embarrassed when the Soviets declared 650.

State and CIA have since upped their SS-20 estimate to 700, indicating a belief that the Soviets are substantially honest in their declared number.

The Defense Intelligence Agency currently estimates that there are between 1,000 and 1,200 SS-20 missiles. The Pentagon has always reported that the Soviets have at least one refire missile per launcher, making 800 to 900 deployed in the field, with 200 to 300 in store.

Other DIA estimates have involved numbers as high as 2,250 based on two separate indications that there is a 5-1 ratio of missiles to launchers.

In the contentious meeting in the Pentagon tank last Friday, Perroto was apparently under pressure to reduce his agency's estimate of SS-20 numbers. According to one usually reliable official source, the general was "ordered" to reduce his number and was told that if he stuck with his number he could be blamed for severely embarrassing the administration and might jeopardize the ratification of the treaty.

At the least it is clear Perroto was under pressure to issue an SS-20 estimate more in line with the Soviet declared numbers.

If the administration can crack the high number estimates, it can come out with an "majority agreed" National Intelligence Estimate of SS-20 numbers close enough to the Soviet numbers to undercut those who say the Soviets have violated the treaty even before it has been ratified and who use this as evidence that the Soviets intend to maintain a substantial covert missile force.

Perroto, the source said, refused to budge, saying that there was no new intelligence that cast doubt on the 1,000 to 1,200 estimate and his job was to produce the best intelligence estimate. The meeting was inconclusive.

Unless a further effort to twist Perroto's arm succeeds, senators may have to face up to the likelihood they are being asked to sign a treaty that removes a whole class of American missiles and leaves the Soviets with a substantial force in place.

Another major problem is that the administration has so rushed into the INF treaty that it has conducted no systematic staff studies of its associated verification problems — despite Presi-

dent Reagan's frequent heavy emphasis on how unprecedented are the measures for verification.

The Arms Control and Disarmament Act of 1961 as amended at the initiative of then-Congressman Ed Derwinski in 1977, section 37 says that the Director of the Arms Control and Disarmament Agency shall report to Congress the degree to which each element of any significant arms control proposal can be verified.

The report must assume that measures of concealment will be employed that the U.S. surveillance and inspection will have to overcome.

The Republican leader of the Senate Foreign Relations committee, Jesse Helms, has written chairman Claiborne Pell, drawing his attention to this so-called Derwinski Amendment. Helms raised the lack of a legally required verification report on the INF to the director-designate of ACDA, Gen. William Burns during his confirmation hearings last week. Burns agreed one was needed and said it was underway and would be expedited.

Helms in a letter to Pell today suggested that the completion of INF Treaty hearings and markup be deferred until an adequate verification report is received from ACDA.

Most major internal assessments done to date have concluded that with present and planned satellites and other sensors, the United States has a very small capability for discovering mobile missiles the Soviet Union wishes to conceal.

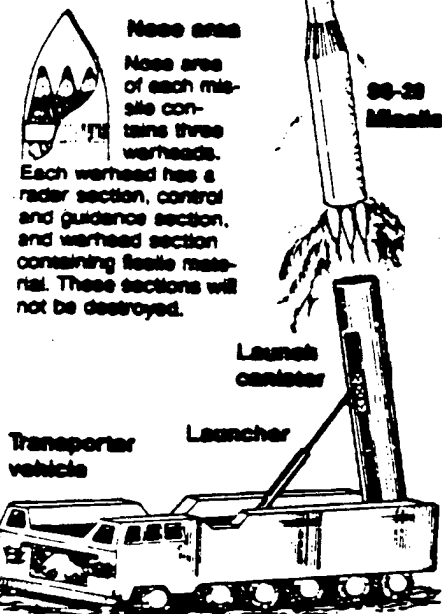
Conservative senators may use the inadequacy of verification — in the face of evidence of a substantial covert missile force — as a flag around which resistance to the treaty can be rallied.

The Washington Post
 The Washington Times
 The Wall Street Journal
 The Christian Science Monitor 3
 New York Daily News
 USA Today
 The Chicago Tribune

Date 3 FEB 88

Destroying missiles

INF Treaty specifies what can and can't be kept



SS-20 (650 missiles, 408 deployed)
 To be destroyed: missile, launch canister, launcher, missile transporter vehicle, fixed shelter for a launcher

Other INF components to be destroyed

SOVIET UNION

SS-4 (170 missiles, 95 deployed)
 Missile, missile transporter vehicle, missile erector, launch stand, propellant tank

SS-6 (8 missiles, none deployed)
 Missile

SSC-X-4 (34 missiles, none deployed)
 Missile, launch canister, launcher

SS-12 (725 missiles, 289 deployed)
 Missile, launcher, missile transporter vehicle

SS-23 (288 missiles, 167 deployed)
 Missile, launcher, missile transporter vehicle

UNITED STATES

Perthling 2 (267 missiles, 128 deployed)
 Missile, launcher, launch pad shelter

Ground-launched cruise missile (602 missiles, 388 deployed)
 Missile, launcher, launch canister

Perthling 1A (170 missiles, none deployed)
 Missile, launcher

Source: Arms Control Association

LISA REMILLARD STAFF ILLUSTRATION BY WIL KALBER

Treaty critics aim beyond ratification

Conservative objections to the INF pact could frame the debate over cuts in long-range nuclear missiles.

By Peter Grier
 Staff writer of The Christian Science Monitor

Washington

Critics have come out swinging in the opening rounds of Senate hearings on the U.S.-Soviet treaty banning medium-range missiles.

The Reagan administration and Senate arms control proponents have clearly been put on the defensive by the arguments of Sen. Jesse Helms (R) of North Carolina and other conservative opponents of the pact.

Senator Helms's complaint that the treaty would not literally destroy warheads received so much attention that Secretary of Defense Frank Carlucci, on Monday, felt compelled to bring missile models before the Foreign Relations Committee to demonstrate what would and wouldn't be scrapped.

The intermediate-range nuclear forces (INF) treaty itself still seems headed for relatively easy Senate ratification. Critics appear to be using the INF hearings as a soapbox from which to influence crucial national defense decisions that will be made after treaty ratification.

In particular, they seem to be aiming at the current strategic arms reduction talks (START) in Geneva on 50 percent cuts in long-range nuclear arsenals. "The right wing ought to be trying to kill START through INF," says a congressional aide who follows arms control.

Conservatives deny they are trying to stop strategic talks out-

right. Among positions that INF pact critics have taken:

- There should be no reductions in strategic weapons without agreement to reduce conventional arms in Europe. In making this point Monday, retired Gen. Bernard Rogers, former military chief of NATO, complained that the United States "should have at least tried" to link conventional reductions with the INF treaty.

- A strategic weapons treaty should have even stricter verification provisions than the INF pact. Defense Secretary Carlucci has agreed with this point, saying that any START treaty would have to include a provision allowing US inspectors to visit any suspect Soviet missile site they want to.

- The US ought to be prepared to withdraw from the INF pact if the Soviets cheat. "Some kind of language to that effect" ought to be in the treaty, General Rogers said.

Rogers has long said bluntly that the INF treaty gives him "gas pains." His successor as NATO commander, Army Gen. John Galvin, said the treaty will not undercut the alliance's ability to maintain peace in Europe.

"The treaty, if ratified, will still allow me to carry out my mission, which is to maintain deterrence," General Galvin told the Senate Armed Services Committee yesterday. Galvin said NATO needs to improve its conventional forces but said they present "a real deterrent to the Warsaw Pact."

Continued

Rogers's criticism of the treaty was praised by conservatives such as Sen. Dan Quayle (R) of Indiana and Sen. Steve Symms (R) of Idaho.

Helms, however, has clearly led the treaty opposition. From his seat on the Foreign Relations Committee he has gleefully badgered administration witnesses.

One of his primary charges has been that the Soviets are already violating the pact by concealing between 165 and 300 SS-20 missiles. This charge is based on a past estimate of the SS-20 arsenal produced by the Defense Intelligence Agency.

FILE PHOTO, AP

Administration officials countered that the Central Intelligence Agency had a lower estimate of SS-20 numbers, and therefore believes that the number the Soviets say they possess is accurate.



Jesse Helms concerned about missile warheads

Carlucci said that in any case, the USSR would not be able to test missiles from such a hidden cache, and thus they would quickly lose any military effectiveness.

Helms also garnered much publicity for complaining that the treaty does not require destruction of actual warheads. Thus nuclear explosives could be removed from SS-20s and simply rebolted onto new weapons aimed at the U.S., he charged.

Administration officials admit that the INF pact does not literally require warhead destruction. Though launchers, missile boosters, and nose cone shrouds would be shredded, important interior portions - radars, warhead packages containing fissile material, and guidance systems - can be kept intact.

First of all, Carlucci said, destruction of fissile material is a "virtual impossibility." Second of all, he said, it is in the U.S. interest to keep these interior portions around, as it is much easier for the Soviet Union to produce crucial uranium and other radioactive elements.

Finally, it is not true that SS-20 components can simply be screwed on to other missiles, Carlucci said. "This could not be done without some redesign and some testing," the defense secretary said.

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INF gets broad diplomatic, military backing
 By DANA WALKER

WASHINGTON (UPI) — The NATO commander, a key ambassador and five former U.S. defense secretaries are endorsing the INF treaty under review by the Senate, but not without reservations about guarding against Soviet deception.

In the second week of ratification hearings on the Intermediate Nuclear Forces accord, Gen. John Galvin, Ambassador Richard Burt and the ex-Pentagon chiefs told senators they generally support the pact eliminating superpower missiles with ranges of 300 to 3,400 miles, mostly deployed in Europe.

However, the witnesses agreed Tuesday, past Soviet cheating on treaties is deserving of Senate attention and warrants a specific U.S. response plan.

Galvin and NATO-nation envoys such as Burt, the ambassador to West Germany, were asked to restate their cases today before the Senate Foreign Relations Committee, which heard from the former defense secretaries Tuesday.

Four members of the Joint Chiefs of Staff, meanwhile, were summoned by the Armed Services Committee one day after Galvin and Burt testified there. CIA Director William Webster was to discuss the treaty privately today with the Senate Intelligence Committee.

Burt told the defense panel the INF debate constitutes "a battle for the soul of Europe" and rejection of the pact or adoption of any "killer amendments ... would have to be viewed as a serious betrayal of an understanding we have had with the allies over seven years."

He explained that the treaty reflects the faith of European allies, despite strong opposition by the peace movement in their countries, that the United States deployed its Pershing 2 and cruise missiles in Europe in 1983 as a way to get the Soviets to the negotiating table.

The former defense secretaries — Caspar Weinberger, Harold Brown, James Schlesinger, Robert McNamara and Elliot Richardson — supported that argument by emphasizing the Soviet fear of Pershing 2 missiles.

Kremlin leaders "are inordinately afraid of the Pershing 2" because from a launch in Europe it could hit their government headquarters, Brown said.

Soviet leader Mikhail Gorbachev, who signed the INF treaty with President Reagan two months ago, "is giving up quite a lot to get one thing that he urgently wants," said Weinberger, referring to the Pershing removal.

The Soviets would lose 1,753 missiles compared to 867 for the United States under the agreement, which must be approved by two-thirds of the Senate.

The numbers reported by the Kremlin have been questioned by the treaty's main critic, Sen. Jesse Helms, R-N.C., who cites a 300-missile difference in CIA and Defense Intelligence Agency estimates of how many

Continued

Page

Soviet SS-20s exist.

Weinberger addressed that concern Tuesday but echoed the statements of other experts who have said the treaty would make it so tough to test any hidden missiles without getting caught that they soon would be militarily unreliable.

"I don't know whether they have 300 more missiles or not," Weinberger told Helms. "No one has claimed that the verification is 100 percent perfect."

Agreeing with Helms that specific response plans are warranted, Weinberger said, "There's been a lot of Soviet cheating in the past. Their definition of truth ... is different from ours. We expect they will cheat."

"I think they'll cheat just to stay in practice," Helms retorted.

Schlesinger expressed the most reservations among the former Pentagon chiefs, warning that the new accord has strained the Western alliance and that danger lies in using its verification measures as precedent for more comprehensive future agreements, such as a treaty on longer-range strategic weapons.

"The conclusion is clear," Schlesinger said. "Caution is the watchword."

Future verification requirements were expected to be addressed today in a study by the American Enterprise Institute, a conservative research and policy organization whose resident scholars include former U.N. Ambassador Jeane Kirkpatrick and former Assistant Defense Secretary Richard Perle.

OPINION

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DECEMBER 1987

Pg. 5

The Case Against the INF Agreement

President Reagan and his senior advisers are promoting the agreement on Intermediate Nuclear Forces (INF) as a major "breakthrough" in arms control. It includes on-site inspections inside the Soviet Union and permanent monitoring of Soviet compliance. The agreement will cut four times as many Soviet warheads as American, eliminating a whole category of nuclear missiles. Moscow's accurate SS-20 mobile missiles will be banned worldwide.

With all those benefits, what can be wrong with this agreement? Here are a few things:

- The Soviets are continuing to violate existing agreements, including the ABM treaty.
- It eliminates the weapon the Soviets fear most, the Pershing II medium-range missile.
- It bans non-nuclear ground launched long-range cruise missiles, in which U.S. technology is superior.
- It begins the denuclearization of Western Europe.
- It leaves in place the huge Soviet and Warsaw Pact conventional forces that threaten Western Europe.
- The Soviets can simply retarget some of their SS-25 ICBMs on the SS-20's targets.
- It promises the impossible: effective verification of small mobile missiles in the huge Soviet land mass.
- It is a long legal document with numerous ambiguities, and could easily be undermined by Moscow.
- It creates a new, unrealistic arms control euphoria that is leading to a new détente.
- The administration has no program to enforce Soviet compliance with the agreement.
- The administration is doing nothing to strengthen NATO's non-nuclear defenses.

These are serious concerns that deserve consideration.

The Soviet violation of existing agreements must come first. Six times in the last four years Ronald Reagan has issued reports of Soviet violations of arms control agreements, including significant violations of the anti-ballistic missile (ABM) treaty. It is generally acknowledged that soviet compliance with existing agreements should be a prerequisite of any new agreement, yet the administration has failed to insist on a prior resolution of these issues.

The INF agreement is popular in Moscow because it eliminates the Pershing II, the one weapon in Europe that can strike Soviet territory with great accuracy in just 10 to 12 minutes. Moscow has tried for eight years to kill the Pershing II. The INF agreement finally accomplishes that goal.

The agreement removes the most effective deterrent to the Soviet forces that threaten Europe, where two conventional wars this century have killed tens of millions. Nuclear weapons, however, have protected Western Europe for over 40 years and steps leading toward their elimination will restore the spectre of conventional war to the continent.

The denuclearization of Europe has long been a principal goal of Soviet policy. Now, Moscow and Bonn are eager to eliminate the short-range tactical missiles that will remain after the INF agreement. This could lead to a nuclear-free Western Europe open to intimidation by the Red Army, a Germany drifting toward neutrality, and the gradual dissolution of NATO. It gives a huge boost to the radical left in Europe, which opposes U.S. policy and has long demonstrated for the removal of nuclear weapons.

There is an inclination to say that our European allies brought this on themselves, by relying on the United States to provide much of their defense, and by refusing to make the hard decisions needed to defend Western Europe against the 50,000 Soviet tanks and other conventional forces that threaten it. But does the United States really want a neutral Western Europe more subject to Soviet pressures?

A major concern with the INF agreement is its lack of effective verification and compliance. The president boasts that the agreement has the most effective verification ever. That is undoubtedly true. But even the best verification is still inadequate when the things being verified are small and mobile. What good is it to inspect agreed upon sites with diligence when Moscow may be violating the agreement at other locations? What good is it to ban SS-20s when Moscow is building SS-25s that can strike the same targets? The small mobile missiles covered by this agreement can be hidden under any roof and cannot be seen by satellites. They can be moved rapidly to new locations. And the numbers of Soviet weapons have been provided by the Soviets themselves.

The Soviet SCUD B is a battlefield missile with a range of 300 kilometers. It will be permitted under the INF agreement. The 500 kilometer range SS-23, however, will be banned. What is to prevent the Soviets from extending the range of the SCUD B or building a follow-on to it with greater range? How would the West know the range of such a weapon if the Soviets did not test it at its full range?

But even more serious than verification is compliance. The United States has been able to verify many Soviet arms control violations, but the government has been unable or unwilling to take the next step—to try to make the Soviets comply fully with the agreements they have signed. Without effective compliance, even the best verification is meaningless.

One would expect the Western Alliance to move promptly to improve its conventional defenses to compensate for the elimination of the Pershing IIs and cruise missiles. An important step would be to deploy anti-tactical ballistic missile defenses as soon as possible, both to protect NATO against the short-range ballistic missiles that will remain and to provide insurance against Soviet cheating on the INF agreement. Another option would be to increase Western offensive weapons, such as sea-launched or air-launched cruise missiles. But today neither the administration nor the NATO allies are willing to take the steps needed to strengthen the alliance.

Probably the most serious deficiency of the INF agreement is the atmosphere it creates. It promotes the illusion that Western security can be assured cheaply and easily by arms control agreements rather than defenses. It encourages the Western allies to cut their defense budgets, neglect the need for defenses against ballistic missiles and to disarm, even as the Soviets maintain and modernize the military forces they use to intimidate opponents and advance their goal of global expansion. This agreement is no panacea.

Authoritative figures, including Henry Kissinger, have said the INF agreement is badly flawed, but it must be ratified anyway or the U.S. will undermine its NATO allies. This is an argument for national irresponsibility. The Senate is responsible under the Constitution to give the agreement full and careful consideration, and to amend or reject it if it does not serve the interests of U.S. national security. The Senate owes it to the American people to do no less.

Rules, Timetables: What the Pact Would Do

The U.S.-Soviet treaty banning intermediate-range nuclear-force (INF) missiles would eliminate a total of 859 U.S. missiles and 1,836 Soviet missiles, according to data exchanged by the two governments when the treaty was signed Dec. 8.

The number of nuclear warheads that would be removed from the front lines cannot be directly calculated from those totals, since they include missiles that are not deployed and that carry no warheads.

According to an estimate by the staff of the Senate Foreign Relations Committee, the treaty would remove from front-line service nearly four times as many Soviet warheads as U.S. warheads: 1,667 Soviet weapons compared with 429 U.S. ones. One-third of the Soviet missiles covered by the accord are SS-20s carrying three warheads each. The treaty:

- Requires elimination within three years of all U.S. and Soviet ground-launched missiles with ranges between 1,000 and 5,500 kilometers (roughly 600-3,300 miles). These include the U.S. Pershing II and ground-launched cruise missile (GLCM) and the Soviet SS-4, SS-5, SS-20 and SSCX-4 missiles.

- Requires elimination within 18 months of all ground-launched missiles with ranges between 500 and 1,000 kilometers. These include the U.S. Pershing IA (no longer deployed in Europe) and the Soviet SS-12 and SS-23 missiles.

- Requires removal from Europe of U.S. nuclear warheads earmarked for use on West German Pershing IAs. The West German missiles are not explicitly mentioned.

- Specifies in great detail the procedures by which the barred missiles and associated launchers must be destroyed. For instance, it provides that GLCMs (which are small, robot jet planes) must be cut in half, separating the wing section from the tail section.

- Permits removal of the guidance systems and nuclear warheads from the banned weapons before they are destroyed. While the warheads might not fit other missiles, the nuclear fuel they contain could be salvaged and used to build new warheads.

- Permits destruction of up to 100 missiles by launching them, rather than cutting them up.

- Bars all further manufacture or flight testing of missiles with ranges between 500 and 5,500 kilometers.

- Requires each country to provide an inventory of all missiles covered by the treaty (and their associated launchers and support equipment) together with a list of all sites where such missiles and equipment have been manufactured, repaired, tested, deployed or stored. In the "memorandum of understanding" containing these data, the Soviet Union listed 128 sites and the United States listed 30 sites.

- Provides that either country may withdraw from the treaty on six months' notice, if it decides that events related to the subject of the treaty jeopardize its "supreme national interests." This is a standard clause in security-related treaties.

- Bars either country from "assuming international obligations or undertakings" that would conflict with the treaty.

The treaty specifies in considerable detail the procedures by which each country can monitor the other's compliance. Like earlier U.S.-Soviet agreements limiting longer-range "strategic" weapons, the pact forbids interference with reconnaissance satellites and other "national technical means" for each country to verify the other's compliance with the treaty.

Moreover, to prevent testing new missiles under cover of disposing of old ones, it forbids the encoding of data transmitted from the 100 missiles that can be disposed of by launching. But the most widely touted aspect of the treaty's verification regime is its extensive provision for "on-site" inspection of each country's compliance by officials of the other. The treaty permits:

- Teams of inspectors from each country to visit all designated sites in the other country at the start of the treaty period to verify the data concerning the number of missiles, launchers and other components at each site.

- A "close-out" inspection of each designated site after the INF missiles have been removed and the related facilities razed.

- On-site observation by each country of the other's destruction of INF missiles and equipment.

- Each country to station a team of 30 resident inspectors for 13 years at the gates of one missile assembly plant in the other country, empowered to inspect all shipments from the plant to ensure that none contains forbidden missiles. The Soviet facility is a plant in Votkinsk, near the Ural Mountains, where SS-20s were manufactured and where the SS-25 intercontinental missile currently is manufactured. The SS-25 is not covered by the treaty, but sections of it are very similar to the SS-20. The corresponding U.S. facility, where Soviet inspectors will man the gates 24 hours a day for 13 years, is a plant in Magna, Utah. Pershing IIs once were built there; now the plant builds part of the Trident II sea-launched missile.

- Each country to conduct "short-notice" inspections of up to 20 designated sites (except for missile production facilities) during the first three years after the treaty takes effect. Inspection teams would be permitted to fly into designated entry points without announcing in advance which site they intend to inspect. Once they had landed and declared their destination, the country being inspected would be obliged to transport the inspectors to that site within nine hours.

- Up to 15 such short-notice inspections in the five years beginning three years after the treaty takes effect.

- Up to 10 short-notice inspections in the following five years.

The treaty also requires the Soviet Union to take certain steps to facilitate U.S. verification that SS-20s are not deployed at certain sites where the similar but larger SS-25 is deployed. Six times annually during the first three years the treaty is in effect, the United States can demand that the Russians expose to the view of reconnaissance satellites all missiles and launchers at any SS-25 base. Normally, the missiles and launchers are concealed in "garages."

—By Pat Towell

Every week in "Outposts," Outlook examines contemporary ideas that are changing our lives and expanding our intellectual frontiers. This week, John A. Adam looks at new verification technologies necessitated by arms-control agreements. Adam is an associate editor of IEEE Spectrum, the monthly journal of The Institute of Electrical and Electronics Engineers.

ARMS CONTROL

Verification: Keeping Ivan Honest

By John A. Adam

WHEN THE SENATE begins hearings Monday on the INF arms-control treaty, a crucial issue will be whether—and how—the United States can detect potential Soviet violations.

The subject is critical because both the INF accord and the Strategic Arms Reduction Treaty (START) now being negotiated in Geneva will require unprecedented verification technologies. Unlike previous arms accords, which involved watching large structures such as fixed missile silos and bombers, INF and START would restrict individual small missiles.

Consequently, America's traditional monitoring systems—surveillance satellites and electronic intelligence—will not be sufficient. Extensive cooperative measures will be needed. Trucks and railroad cars must be inspected; plant gates, grounds and fences watched; small weapons examined for nuclear content. And the INF pact requires new systems for continuous monitoring of missile-production facilities.

Exactly what kind of sensors the United States will place on Soviet soil is still being decided. But U.S. research on on-site inspection systems—involving tamper-resistant fiber-optic seals, video alert and data-encryption systems, infrared surveillance arrays and more—is already well underway, much of it at Sandia National Laboratories in Albuquerque, which AT&T runs for the Department of Energy.

Overcoming Mutual Mistrust

Problems abound when working in an adversary's territory. The verification system must ensure that each side can trust the authenticity

of the on-site data, producing a paradox: The Soviets must be assured that information gathered is for verification only—not espionage—and that it agrees with the facts. Thus, data cannot be encrypted. But the United States must be confident that streams of data, traveling through open channels in Soviet territory, are not forgeries. Thus some form of encrypted authentication code must be used.

Cracking that puzzle falls to Sandia's Gustavus J. Simmons, a mathematician with a foot-long beard and a flattop coif who has been solving such brainteasers for 20 years. Simmons and his colleagues are perfecting a data system that guarantees integrity. The technique that the United States will propose to the Soviets is the least sophisticated of Simmons' schemes. [See box.] But it has already passed the scrutiny of codebreakers at the National Security Agency and was discussed with the Soviets in the '70s during the Comprehensive Test Ban Treaty talks. Moreover, it has proven reliable at remote U.S. seismic stations in Norway that glean data from Soviet underground nuclear tests.

The system works by automatically attaching an authentication "word" to the output of a monitoring device such as a camera. The output, in the form of a long binary sequence (strings of 0s and 1s), is fed into a computer, which breaks the data up into small blocks of, say, 64 bits. The first block is encrypted with a secret key which produces a 64-bit cipher held in the computer's memory. As the second block of data arrives, each element in the cipher is matched with its corresponding element in the second data block. If the two elements are alike, a 0 is recorded; if different, a 1. This produces a new 64-bit number, which replaces the first cipher and is in turn encrypted with the key. This new cipher is then matched against the contents of the third block

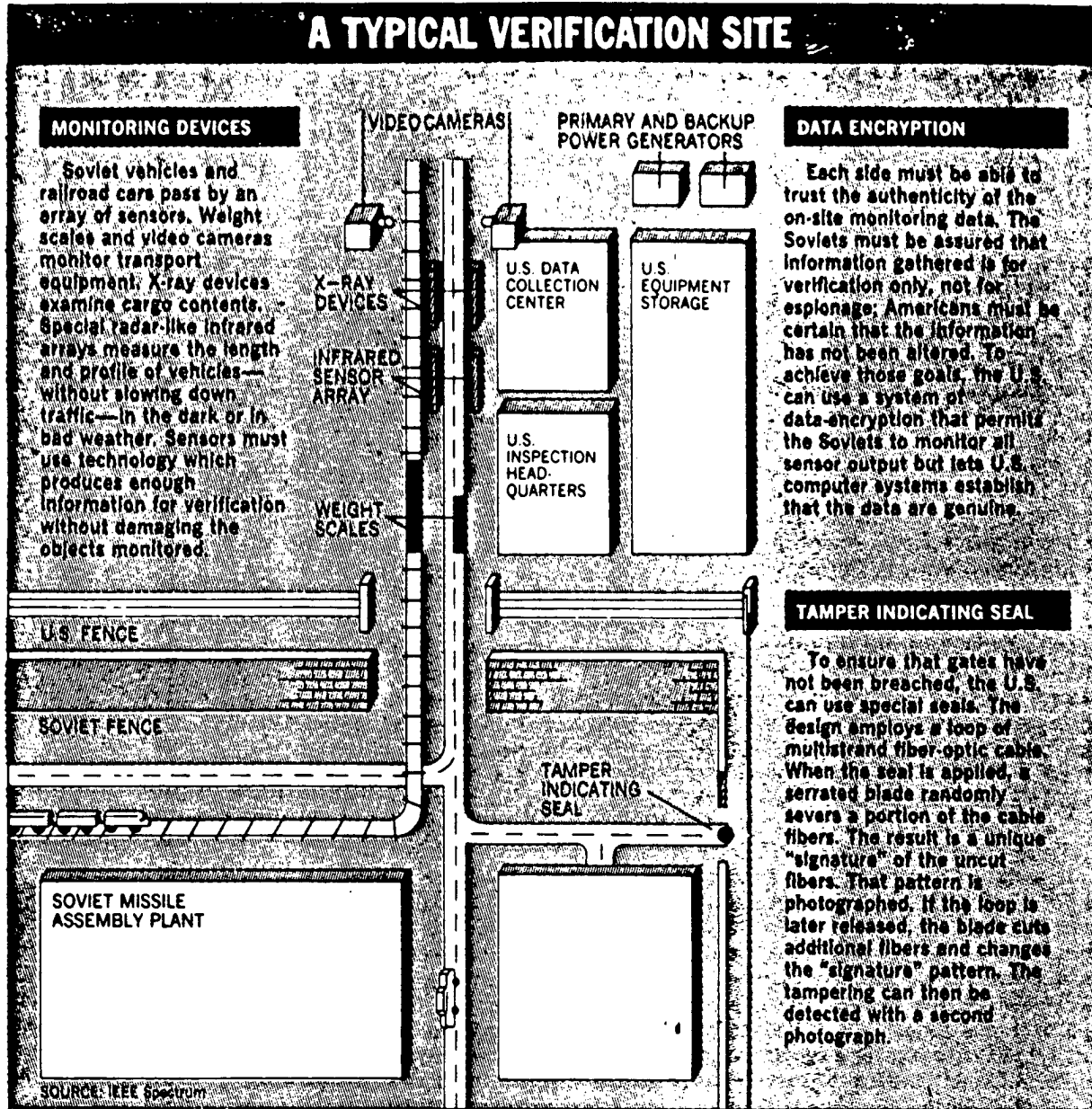
of data, which begets yet another new cipher and so forth. The end result, after processing an entire data stream thousands of bits long, is a final 64-bit cipher incorporating information about each bit of data in the whole stream. This final cipher, or authentication word, is appended to the unencrypted monitor output and sent.

Nothing in the process prevents the Soviets from scrutinizing the data while it is sent. And the United States can verify the result by running the received data through the same encrypting procedure using a copy of the secret key. If the final cipher generated matches the one that was appended to the original monitor output, then the data are genuine. Just as increasing the number of grooves in a housekey makes it harder to pick the lock, the more variables there are in a cipher key, the less the likelihood of cracking the code.

On-Site and On Guard

Shortly before the 1986 summit in Reykjavik where the Soviets agreed to U.S. proposals regarding on-site INF monitoring, Roger L. Hagengruber, vice president of systems analysis at Sandia, got a phone call from the Pentagon. DOD wanted a full-scale test facility built to examine schemes for continuous monitoring of a Soviet weapons-production plant. It also wanted a working model of the site. The project was given top priority.

Within two months, the Sandia team produced a table-top model showing the section of a typical Soviet missile factory which includes the main portal. [See illustration.] The Pentagon displayed the model to officials from the White House, State Department and Congress, demonstrating how a missile-carrying truck triggers a suite of sensors to record weight and other data. One U.S. official called it a "good



marketing tool" that helped policymakers visualize potential problems.

Both the United States and the Soviet Union have agreed that INF monitoring systems for the exits will include "weight sensors, vehicle sensors, surveillance systems and vehicle dimensional measuring equipment." In addition, "non-damaging image-producing" gear will be installed to examine contents of shipping containers and launch canisters. The goal is to devise a system that automatically collects and records data 24 hours a day. The monitoring system must be accurate enough to detect potential violations but work fast enough so traffic flow is not unduly impeded. And because deployment within Soviet borders precludes use of trade-secret equipment, engineers must create highly reliable systems composed main-

One such device is a vertical and horizontal array of infrared sensors to measure rapidly the length and profile of various vehicles leaving the plant. Like radar, the system would send out its own energy beam to sense objects day or night and in adverse weather. For weighing, Hagengruber says commercial scales can be modified to assess a moving truck or to weigh loads on freight trains. Railroad cars in some respects are easy to monitor because they are constrained to tracks, have a fixed geometry and uniform velocities. But they also pose special problems because they may weigh much more than their freight and the cars may come in a mix of gondolas and box cars. To skirt this problem, Hagengruber says they may negotiate that only certain types of train cars are allowed into the plant.

If a vehicle is large and heavy enough to be carrying a prohibited missile, its cargo will be examined by non-destructive imaging, most likely by X-ray sensors tuned to appropriate intensities. X-rays can take measurements and determine material composition and are generally hard to deceive. Manufacturers of rockets routinely use them to inspect solid propellants for cracks. For verification, however, the scans must occur faster than industrial applications, and probably be less intrusive too, says Hagengruber.

Sandia is also examining tamper-resistant seals that would reliably indicate if enclosures had been breached. In one such device, a loop of multistrand plastic fiber-optic cable is cut to desired length in the field. Its ends are put into a one-piece seal body which contains a serrated blade that randomly severs a portion of the cable fibers. The result is a unique "signature" of the uncut fibers. That pattern is photographed. If the fiber-optic loop is later released, the blade is designed to cut additional fibers and change the signature. During inspection, a second Polaroid shot is taken for immediate comparison with the original signature.

Warheads and Holograms

Authorities note that it is much easier to verify a ban than a residual force of, say, 100 missiles. Consequently the START pact, because it seeks to halve levels of strategic warheads, will require more strict measures.

In addition, the two superpowers are discussing in Geneva how to limit nuclear-tipped cruise missiles on ships and submarines. Such controls pose special monitoring problems because the missiles are much smaller than other strategic weapons and because some

techniques to "tag" concealable mobile nuclear weaponry. The challenge is to design a system that permits counting for verification but does not allow targeting by the military.

Fred Holzer, deputy leader of verification at Lawrence Livermore National Laboratory, outlined further constraints during a 1986 interview. The tags must be tamper-proof and impos-

sible to duplicate; and they must in no way interfere with the missile's operation, he explained. Moreover they must be designed so they cannot be used—or even be perceived to be usable—as a homing device.

Numerous schemes exist. For new missiles, tags might be installed at the production line. One possibility is to make a special mold with an intricate surface pattern for producing a tag. After the required number were produced, Holzer said, the mold could be broken. Another possibility, for new or existing weaponry, is to make a photomicrograph or acoustic hologram of a small patch on the missile. Each weapon examined could then be checked against a database of the fiber patterns of "legitimate" missiles.

Yet another option is to use a microchip tag that could be queried on inspection. The basic technologies that might be used are being employed by auto manufacturers including BMW, Fiat and Honda. BMW's assembly line uses chips coded to contain such information as paint color, options to be installed and so forth for each chassis. The chip is queried during assembly stages and the specified actions taken. Honda uses an intrinsic property, like fiber grains, to guard against piracy in spare auto parts. Other scenarios are akin to existing methods of satellite tracking of caribou. A U.S. satellite monitors free-roaming herds fitted with radio transmitters in northwestern Alaska to an accuracy of 0.8 kilometers. Holzer says that "these kinds of techniques are being developed rather rapidly." A senior administration official observes, however, that despite all the studies no practical tagging schemes have yet emerged.

START verification might include a plan to designate assembly areas to make missile production more transparent to surveillance satellites. But satellites cannot provide the sort of information that Soviet leader Mikhail Gorbachev mentioned in his summit farewell speech, when he shocked

many observers by declaring that the Soviets had a technique that would remotely "identify not only the presence, but also the capacity of the nuclear warheads" aboard mobile vessels.

If it exists, such a device probably emits a pulse of high-energy neutrons to induce a small amount of fission in any nuclear warhead. The pulse would have to be weak enough to prevent the degradation in the reliability of the nuclear weapons but strong enough to produce a recognizable signature of gamma rays or neutrons. But because of the rapid degradation of this signature in the atmosphere, such measurements must be made from close range. Moreover, shielding by lead or water could foil the inspection. More detailed schemes must be fielded for effective START verification.

A November 1987 report by the House Intelligence Committee was unanimous in saying that the Executive Branch provides "no central direction and prioritization of research and development to improve arms control monitoring capabilities." It placed the blame largely on the intelligence community.

Indeed many technologies for use in the INF treaty were developed for other purposes. Participants say some analyses, such as whether inspections of suspect sites should be allowed, were done hastily.

Although INF negotiations began in November 1981, money for the major INF monitoring program started flowing several years later. The Department of Defense was the surprising source, including the international security policy branch formerly headed by Richard N. Perle, popularly known as a bete noire of arms control.

In spite of budget constraints, Congress supplemented administration requests for verification research for fiscal 1988. Whether that results in innovative techniques for monitoring the strategically sensitive START pact remains to be seen.

Secrets and Ciphers

THE DRAWBACK in the simplest version of Gus Simmons' scheme is that the Soviets would not know everything being sent. But the secret key used to authenticate old messages would be periodically supplied to the Soviets, who could then exactly reconstruct the authentication words to determine whether espionage information existed. The Soviets could also dismantle a similar piece of authentication gear to discern its intelligence potential.

In that simple approach, the same key is used to encrypt and decrypt a message. In 1976, however, a different method emerged. Called public-key cryptography, it uses one key to scramble a message and a different key to unscramble it. Hence the ability to decrypt a message does not also permit one to make forgeries.

Such a scheme is ideal for verification work, for it allows authentication without secrecy, and it can prevent some convoluted ways of cheating. The United States would encrypt the entire message and share the decrypt key with the Soviets and any other third party. All parties could decipher the data as it was transmitted. Simmons' group at Sandia uses the Rivest-Shamir-Adleman algorithm where the encrypting party bases its key on a pair of prime numbers P and Q that are kept secret and are so large that factoring $N = PQ$ is beyond all projected capabilities of computers. The United States would be confident that the data were genuine because it would be practically impossible, even with supercomputers, to determine the encryption key in time to alter the data.

But under that scheme, the party doing the encryption could send a forgery. Because of that ability, the Soviets could disavow any incriminating message, telling the United Nations, for example, that U.S. data indicating a trainload of illegal SS-20 missiles was a fabrication. So in 1980, Simmons' group devised a method whereby the United States and the Soviet Union would collaborate in the encryption.

But several years ago, it was realized that unilateral action of either party—saying its secret encryption key had been compromised, for instance—would circumvent the system. So Simmons, in his fourth iteration, proposed that a third party do on-site encryption using the public-key technique. With at least three parties contributing to the message-scrambling, the system was immune to impeachment by unilateral actions.

"Each time you solve one problem and peel off that layer of difficulty," says Simmons, "you find a more subtle one inside." But for now at least, he thinks the problem is finally solved. If the Soviets do not agree on his first-generation system, there are many alternatives.

—John A. Adam

By MICHAEL R. GORDON

Special to The New York Times

WASHINGTON, Jan. 27 — On Dec. 6, two days before Mikhail S. Gorbachev and President Reagan were to sign a new missile accord in Washington, American and Soviet negotiators were still arguing in Geneva about a key treaty detail.

As the evening wore on, Maynard W. Giltman, the chief American negotiator, angrily accused his Soviet counterpart, Aleksei A. Obukhov, of stalling and jeopardizing agreement over the issue — the American insistence that inspectors should be able to look inside Soviet structures big enough to hide rocket stages, but too small to hide the SS-20 missiles that were to be eliminated under the terms of the treaty.

"I've had it," said Mr. Giltman, suggesting that the issue be taken up the next day. "I'm leaving."

Just a Misunderstanding

But finally, Mr. Obukhov gave in. The entire dispute, he said, had simply been a misunderstanding.

Shortly after midnight, the senior negotiators initialed the final treaty text, which gave the Americans the inspection rights they wanted, and brought six years of negotiations to an end.

In the Senate hearings on the new missile accord this week, the way the treaty was negotiated — and whether the United States agreed to flawed provisions to meet the summit deadline — have emerged as key issues. On Thursday, Paul H. Nitze, the senior arms-control adviser to Secretary of State George P. Shultz, will testify before the Senate Foreign Relations Committee.

Interviews with American officials familiar with the secret negotiating record reveal that the American posi-

Late in the game, Washington's position was still in flux.

tion on key verification issues was indeed in flux until surprisingly late in the negotiations. In addition, American officials say, the Russians tried to back away from some concessions they made at a meeting between Mr. Shultz and Eduard A. Shevardnadze, the Soviet Foreign Minister, only two weeks before the summit meeting.

But once the general outlines of the verification plan were defined, the Russians appear to have made most of the concessions on important details of how the plan would be carried out.

The question of how to make sure the Soviet side observes the treaty has been a central concern for both the Administration and its critics since the negotiations started. One important issue was what kinds of installations on either side could be inspected at short notice. Another was how the United States would make sure no prohibited missiles were being produced in Soviet installations.

The Administration initially wanted a broad right to carry out short-notice inspections virtually anywhere in the Soviet Union where banned missiles

could be kept — a position promoted by civilian Pentagon officials and known as "anytime, anywhere."

Then American intelligence experts, military officials, and Government weapons developers began arguing that letting Soviet inspectors check sites "anytime, anywhere" in the United States was not desirable at all. Last summer, once the Russians agreed to the principle of eliminating, rather than limiting, medium- and shorter-range missiles based on land, the Administration made less strict demands on verification. The Administration explanation for the reduced demands was that a ban on such missiles would be easier to verify than limits.

The 'Froot Loops Plan'

But last fall, the American delegation was alerted in a cryptic cable that the Administration was reviving the idea of "anytime, anywhere" inspections.

In mid-November, less than a month before the summit meeting, the chief American arms negotiator, Max M. Kampelman, and a National Security Council aide, Col. Robert E. Linhard of the Air Force, arrived in Geneva, and Colonel Linhard made a proposal known as the "Froot Loops plan" to the Soviet negotiators.

Under this plan, if the Russians asked to inspect an innocent American installation — Colonel Linhard used the example of a factory that made Froot Loops breakfast cereal — the United States would consult with the private concern and allow the inspection to proceed.

But if the Russians asked to inspect a highly sensitive installation, the United States would have the right to turn down the request. As Colonel Linhard reportedly explained it, each country would maintain a list — kept secret from the other side — of installations, like sensitive intelligence sites, that would not be open to inspection.

U.S. Negotiators' Qualms

The American negotiating team in Geneva was dubious about this plan, which conflicted with what they had already told the Russians. What would happen if the Russians put too many installations on their secret list, some of them wondered. Others worried that some American installations were too secret to be put on a list that might somehow be made public.

Yuli M. Vorontsov, then the top Soviet arms negotiator, abruptly dismissed Colonel Linhard's suggestion. The Administration decided that the proposal would never succeed, and dropped it.

The negotiators finally agreed on short-notice inspections only at sites on an agreed list of installations for medium-range and shorter-range missiles. Critics see this more limited approach as a serious flaw in the treaty, while the Administration asserts that the total package of verification measures provides sufficient protection against possible Soviet cheating that would have military significance.

Closing the Gaps

By all accounts, the critical meeting that closed the gap between the two sides on key verification issues was the one in Geneva between Mr. Shultz and Mr. Shevardnadze, just before Thanksgiving.

During several days of intense talks, aides to the two officials worked out the basic arrangements for short-notice inspections, and drafted treaty provisions to make it easier for American spy satellites to determine that no prohibited SS-20 missiles could be hidden at SS-25 missile bases.

The two sides also worked out the basic procedures for monitoring the Russian missile assembly plant at Votkinsk, west of the Urals, by stationing inspectors outside of the gates, a monitoring plan originally devised by American experts.

That monitoring was necessary because the Russians had earlier informed the United States that the first stage of their long-range SS-25 missile was very similar to that of their medi-

um-range SS-20 missile, which was to be banned by the treaty, and that both were assembled in Votkinsk. In return, the Americans agreed to allow the stationing of Soviet inspectors outside of an American missile assembly plant in Magna, Utah.

In announcing these breakthroughs, Mr. Shultz told reporters in Geneva: "We have now completed agreement on all of the outstanding I.N.F. issues."

But, as it turned out, a lot of hard bargaining lay ahead.

For one thing, the some critical details of how the monitoring was to be carried out had not been worked out. For another, the Russians began trying to renegotiate some already agreed upon compromises.

Soviet negotiators began arguing that agreement on carrying out short-notice inspections at factories that made launchers for ground-launched cruise missiles meant that the Soviet factory at Volgograd that made launchers for ballistic missiles covered by the treaty should be exempt. The Americans rejected this argument and prevailed.

At the Shultz-Shevardnadze meeting, the Soviet side had appeared to accept the principle that the United States could keep inspectors outside any new Russian installation that assembled SS-25 missiles if one was ever built. But now, Soviet negotiators were saying that the Americans could conduct monitoring only outside of the Votkinsk plant. The Americans objected and prevailed here, too, but they had some last-minute wrangling over the arrangements.

Initially, the Russians said American inspectors would be able to look inside only every 30th missile canister that came out of the plant. The Americans wanted to be able to conduct more frequent inspections at random. It was thus agreed that inspectors could look inside the canisters eight times a year.

Soviet negotiators said that each side should be allowed to have 10 inspectors at each installation. The Americans wanted 40. It was agreed that each side could have 30 inspectors.

The 'Stages Problem'

Even after the treaty terms were agreed on, there were last-minute hitches. Maj. Gen. Vladimir Medvedev, one of the Soviet negotiators, informed the Americans that Moscow had no intention of providing a photo of the SS-20 missile because the Americans would never see an SS-20 missile outside of the canister. The Americans rejected this position. On American insistence, the Soviets sent a telephoto of the missile on the morning the treaty was signed, Dec. 8, and later sent a glossy original.

By Sunday night, Dec. 6, the two sides were down to the "stages problem" that so exasperated Mr. Giltman. The Russians were insisting that they be able to look inside structures that could hide individual rocket stages, since the American Pershing 2 missile is transported in stages and assembled on its launcher.

But the Russians said that American inspectors should not have the same right. They argued that because their SS-20 missiles were transported in canisters, American inspectors should be allowed to look only inside structures that could hide entire missiles.

The Americans demanded reciprocity, seeking to close any possible loophole in the treaty. After saying the Soviet delegation lacked the authority from Moscow to make such a concession, Mr. Obukhov relented.

The next morning, the Americans delayed their departure from Geneva until early afternoon to review the final treaty language.

Soviet negotiators had been instructed to complete the treaty in time for Mr. Gorbachev's arrival in Washington that afternoon, and Mr. Obukhov and General Medvedev hitched a ride with the Americans, who were bringing copies of the treaty with them on a camouflaged Air Force C-141 plane. One member of the American team took an extra precaution to make certain the treaty arrived in Washington for the Tuesday signing. He sent a copy by Federal Express.

Helms and Shultz Are in High-Stakes Duel Over Verifiability of Pact, Missile Numbers

BY PETER SAMUEL
New York City Tribune Correspondent

WASHINGTON, Jan. 26 — While Republican and Democratic senators joined forces today seeking to discredit him, Sen. Jesse Helms, R-N.C., has engaged Secretary of State George Shultz in a high-stakes battle over the ratification of the INF treaty.

At today's testimony before the Senate Foreign Relations Committee, the top U.S. arms control negotiators at Geneva, Max Kampelman and Maynard

Gitman, said the treaty achieves the goal of eliminating Soviet medium-range missiles as a military threat to Western Europe and a political threat to the stability of the NATO alliance.

They told the committee that destruction of the missiles is the crucial provision because that meant that warheads could no longer be delivered to their targets.

Destroying the warheads themselves might be dangerous, Kampelman and Gitman said, because secret U.S. nu-

posed to Soviet inspection. They also cited the risk of radiation contamination throughout Europe.

With other senators siding against him, Helms pressed his claim "that contrary to some public assertions, the treaty does not destroy even one nuclear warhead."

"A missile is a carrying case and the warhead is the thing that goes 'boom' and kills you," Helms declared. "A missile doesn't kill you unless it falls on your head and cracks it open."

Kampelman said the treaty does permit removal of fissionable material and guidance systems before U.S. and Soviet missiles are destroyed by crush-

CONTINUED NEXT PAGE

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ing them, burying them underground or exploding them after an aerial launching.

"The fissionable material by itself is not dangerous," Kampelman said. "The danger involved is when it is linked to that which shoots it, directs it, causes it to explode. A big section of the warhead does get destroyed, does get crushed."

Helms, though, has saved his wrath for Shultz, who has given ratification of the treaty high priority in the final year of the Reagan administration. Helms and his staff are deeply committed to the view that the treaty is detrimental to the security of the United States and its allies, and say, privately, the treaty is being sold with lies.

They say that the administration is misleading the American people on two central issues summed up in the terms: "Monitorability" and "Only 650" SS-20s.

Monitorability refers to the ability of United States intelligence and verification inspectors to adequately track and identify Soviet missiles and detect violations. The "Only 650" issue refers to the credibility of the Soviets' declaration that it has only 650 SS-20 missiles, which will be destroyed under the terms of the INF treaty.

The public has been shown only the tip of the iceberg of this dispute, the senator says, and on Monday he illustrated his point during the public hearings by having an aide walk across the room and deliver to Shultz a top secret report, which Helms said was of "paramount importance to our national security."

In a press release he said earlier that if the classified material was legitimate he would question "whether there should be further Senate action at this time on the proposed treaty."

Helms said he wanted confirmation from Shultz that the document was genuine and that he and the president knew its contents. Shultz declined to open the document, citing the presence of cameras in the room. Helms then suggested that the top secret folder contained material attached to a letter he had written him.

Shultz picked up: "Well, it is... it represents itself as being a set of quotations from highly classified materials that are in the hands of the intelligence people."

Helms: "Yep."
Shultz: "And how you came to have that, I have no idea. You have better access than I do to whatever they [the intelligence people] are doing..."

The Secretary of State then said that, from what he had been able to ascertain, the problems raised in the secret reports "can be dealt with satisfactorily" but this should be discussed with the intelligence people in closed session.

Helms responded that he was encouraged Shultz had read his letter. He then put into the Senate record that he had received a hand-delivered letter from CIA Director William Webster which included the statement: "We have reviewed the highly sensitive classified information cited in the attachment to your letter."

"This information is, in fact, contained in a recent draft of Volume Two of *The National Intelligence Estimate 4/11-88*. The information is substantively accurate, although the final wording in the published version, will, in some cases, be slightly different."

Helms in his letter to Webster charged that the secret material "discloses a major violation by the Soviet Union of the proposed treaty on Intermediate Nuclear Forces."

Officials have been unusually reticent in commenting on the content of the secret materials, but the indications are that they bear in part on two matters already reported in the *City Tribune* in the series published November 13, 16, 17 and 18.

These refer to:

• the intelligence community's great difficulty in detecting mobile Soviet missiles and its need for considerably increased resources in order to be able to detect and identify them with confidence,

• indications from US intelligence that the INF-banned SS-20 missile is being covertly deployed with its slightly longer and INF-allowed "cousin," the SS-25

Two former SS-20 bases in the western Soviet Union, Verkhoyarskaya Saida and Yurya have been gradually converted to SS-25 bases, U.S. intelligence has reported. The SS-25 canisters and garages, which are 10 feet longer than those for the SS-20, over the years 1984 to 1987 displaced the shorter canisters and garages identified as those to hold SS-20s. Analysts in Washington concluded the bases were being converted from the SS-20s to intercontinental SS-25s. U.S. intelligence reported that 36 SS-20s that were thought to be "lost," disappeared from these bases.

Another interpretation is that the same SS-20 missiles were simply moved into the longer canister and garage identified with SS-25s and were given 10 feet of "rattle room" as part of Soviet plans to test their ability to hide their intermediate range force.

In his opening statement today, Senate Republican Leader Robert Dole said he supported ratification of the treaty but said U.S. intelligence would need more resources to do the job.

"The intelligence chiefs I consulted assured me that, with adequate resources, and I underscore that, they can do the verification job," Dole said. "We may well need to beef up our own capability to ensure effective verification."

This is an apparent allusion to intelligence assessments that the United States would only have about a 20 percent probability of detecting an illegally deployed SS-20, and that a principal surveillance system needed to search for mobile missiles — the Indigo-LaCrosse infrared imaging satellite — has been grounded by the space shuttle disaster and the lack of any U.S. heavy-lift launch capability.

A Mobile Missile Task Force Intelligence Requirements and Analysis Working Group (IRAWG) report dated Dec. 11, 1986 and addressed to the director of central intelligence said: "Our current capability to meet adequately the demands placed on our resources to address effectively the mobile missile problem is limited... A true capability to locate, identify and track mobile missiles is evolutionary and will require significant enhancement over present capabilities... It is clear that development of strategies to improve our capabilities will require many more experts than are currently available."

The "Only 650" issue bears heavily on the credibility of the administration, because in its desire to get the treaty ratified, it is endorsing the Soviets' declaration that they have only 650 SS-20s to destroy. Yet, the record is replete with earlier statements by the administration emphasizing that the SS-20 system was built and deployed to reload and refire.

The Pentagon's *Soviet Military Power* publication has always said this, and its pictorial representations of SS-20 units in action have usually shown refire units. The number of refire missiles per ready-to-fire missiles atop their transporter-erector launcher trucks, has been estimated between one and four.

Even with the low estimate of one refire missile per deployed missile, there would, with the administration's count of 441 deployed missiles, be 882 missiles. In addition to those in the field, every missile system has its stockpile of missiles held for test firing and replacement of those that get damaged from the rigors of deployment.

This has led the Defense Intelligence Agency to estimate the SS-20 count to be around 1,000, with other estimates based on Soviet plans for four refires of 2,250.

A memorandum from Helms to his colleagues dated Jan. 25 discusses this issue at length on pages 22 and 23. It says that the DIA has "assumed that the SS-20 force was close to and even over 1,000." It goes on to say some intelligence analysts have estimated the numbers as high as 2,250 and adds: "This number is a derived number, not a detected number; but it is based upon some very reasonable assumptions and intelligence information..."